CLAIMS

We claim:

1. In a transfer case having a first output, a method for controlling a clutch, through which the first output and a second output are driveably connected, the method comprising the steps of:

producing input torque at the clutch;

determining the current clutch slip;

establishing a first desired portion of the input torque to be transmitted by the clutch to the second output;

determining a first magnitude of clutch torque corresponding to the first desired portion;

determining a second magnitude of clutch torque to be transmitted to the second output in proportion to the current clutch slip; and

changing the magnitude of torque transmitted by the clutch to the sum of the first and second magnitudes.

2. The method of claim 1, further comprising the steps of:

monitoring the beginning of the method;

initiating a interval timer for monitoring the elapsed time of the method; and

terminating the method when the elapsed time equals or exceeds a reference period length.

3. The method of claim 1, further comprising the steps of:

monitoring the beginning of the method;

initiating a interval timer for monitoring the elapsed time of the method; and

continually decreasing the magnitude of torque transmitted by the clutch after the elapsed time equals or exceeds a reference period length.

4. The method of claim 1, further comprising the steps of:

determining the occurrence of a predetermined change in magnitude of torque transmitted by the clutch or predetermined change in clutch slip; and

beginning the method upon the occurrence of the change.

5. The method of claim 4, further comprising the steps of:

determining a reference input torque;

repetitively comparing to a predetermined delta torque magnitude a difference between the reference input torque and the current input torque; and

beginning the method when the comparison indicates equivalence.

6. The method of claim 4, further comprising the steps of:

determining a reference time rate of change of input torque;

repetitively comparing the reference time rate of change of input torque to a predetermined time rate of change of input torque; and

beginning the method when the comparison indicates equivalence.

7. The method of claim 4, further comprising the steps of:

determining a reference clutch slip;

repetitively comparing the reference clutch slip to the current clutch slip; and

beginning the method when the comparison indicates equivalence.

8. A method for controlling, with the aid of a digital computer, a clutch through which a first output and a second output are driveably connected, the method comprising the steps of:

inputting to the computer a data base including at least the current torque produced by an engine, a first desired portion of an input torque to be transmitted by the clutch to the second output, and a proportional constant;

repetitively providing the computer with the speed of the first output and speed of the second output;

repetitively calculating in the computer at frequent intervals:

the current clutch slip;

the input torque at the clutch;

a first magnitude of clutch torque to be transmitted to the second output corresponding to the first desired portion of input torque;

a second magnitude of clutch torque, the product of the current clutch slip and the proportional constant, to be transmitted to the second output; and

a clutch duty cycle corresponding to the sum of the first and second magnitudes of clutch torque; and

subsequently outputting from the computer to a solenoid a signal representing the clutch duty cycle, whereby the magnitude of torque transmitted by the clutch is changed in response to the signal.

9. The method of claim 8 further comprising the steps of:

inputting to the computer a reference number;

initiating upon the beginning of the method a counter in said computer for monitoring the number of executions by the computer of the method;

incrementing the counter upon the completion of each executions by the computer of the method; and

terminating execution by the computer of the method when the number in the counter equals or exceeds the reference number.

10. The method of claim 8 further comprising the steps of:

inputting to the computer a reference number;

initiating upon the beginning of the method a counter in said computer for monitoring the number of executions by the computer of the method;

incrementing the counter upon the completion of each executions by the computer of the method; and

when the number in the counter equals or exceeds the reference number, continually outputting from the computer to the solenoid a signal representing a decreasing clutch duty cycle, whereby the magnitude of torque transmitted by the clutch is continually reduced in response to the signal.

11. The method of claim 8 further comprising the steps of:

inputting to the computer a reference number and decrement rate;

initiating upon the beginning of the method a counter in said computer for monitoring the number of executions by the computer of the method;

incrementing the counter upon the completion of each executions by the computer of the method; and

decrementing the clutch duty cycle by the decrement rate upon the completion of each executions by the computer of the method when the number in the counter equals or exceeds the reference number; and

continually outputting from the computer to the solenoid a signal representing the decremented clutch duty cycle, whereby the magnitude of torque transmitted by the clutch is continually reduced in response to the signal.

12. A system for controlling a clutch, through which a first output and a second output are driveably connected, the system comprising:

means for generating a first signal representing the current speed of the first output and a second signal representing the current speed of the second output;

means responsive to the first and second signals for determining the current clutch slip;

means for calculating the magnitude of input torque at the clutch;

means for determining a first magnitude of clutch torque corresponding to a first desired portion of input torque to be transmitted by the clutch to the second output;

means for determining a second magnitude of clutch torque to be transmitted to the second output in proportion to the current clutch slip; and

means producing an output signal for changing the magnitude of torque transmitted by the clutch to the sum of the first and second magnitudes of clutch torque.

13. The system of claim 12, further comprising:

a fluid pressure source;

a servo through which the clutch is alternately pressurized and vented to engage and disengage the clutch; and

a solenoid communicating with the output signal producing means and responsive the output signal for connecting the pressure source and the servo.

14. The system of claim 12, further comprising:

means for monitoring the beginning of the method;

a interval timer for monitoring the elapsed time of the method; and

means for continually decreasing the magnitude of torque transmitted by the clutch after the elapsed time equals or exceeds a reference period length.